READING MATERIAL
SMOG

What Is It?

The term "smog" was first used in London during the early 1900s to describe the combination of smoke and fog. What we typically call "smog" today is a mixture of pollutants but is primarily made up of ground-level ozone.

Ozone can be beneficial or harmful depending on its location. The ozone located high above the Earth in the stratosphere protects human health and the environment, but ground-level ozone is responsible for the choking, coughing, and stinging eyes associated with smog.

Where Does Smog Come From?

Smog usually is produced through a complex set of photochemical reactions involving hydrocarbons and nitrogen oxides in the presence of sunlight that result in the production of ozone. Smog-forming pollutants come from many sources, such as automobile exhausts, power plants, factories, and many consumer products, including paints, hair spray, charcoal starter fluid, solvents, and even plastic popcorn packaging. In typical urban areas, at least half of the smog precursors come from cars, buses, trucks, and boats.

Major smog occurrences often are linked to heavy motor vehicle traffic, high temperatures, sunshine, and calm winds. Weather and geography affect the location and severity of smog. Because temperature regulates the length of time it takes for smog to form, smog can form faster and be more severe on a hot and sunny day. When temperature inversions occur (warm air stays near the ground instead of rising) and winds are calm, smog may stay trapped over your city for days. As traffic and other sources add more pollutants to the air, the smog gets worse. Smog is often more severe away from the pollution sources because the chemical reactions that cause smog occur in the atmosphere while the reacting chemicals are being moved by the wind.

Severe smog and ground-level ozone problems exist in many major cities, including much of California from San Francisco to San Diego, the mid-Atlantic seaboard from Washington, DC to southern Maine, and over major cities of the Midwest.

What Are Its Effects?

Smog is made up of a combination of air pollutants that can injure health, harm the environment, and cause property damage. It has been estimated that about 90 million Americans live in areas with ozone levels above the established standards for health safety. These individuals can be severely influenced by pollutants on a daily basis.

Smog causes health problems such as difficulty in breathing, asthma, reduced resistance to lung infections and colds, and eye irritation. The ozone in smog also inhibits plant growth and can cause widespread damage to crops and forests, and the haze reduces visibility. This is particularly noticeable from mountains and other beautiful vistas, such as those in National Parks.

How Do We Recognize/Detect It?

Smog is a visible example of air pollution. You can look at the horizon during the day to see how much haze there is in the air. In addition, most cities measure the concentrations of pollutants in the air and report the results to the public. Standardized measures have been established, like the Pollution Standards Index (PSI) or the Air Quality Index (AQI), which allow comparison of pollution levels from city to city.

How Do We Reduce Its Effects?

The 1990 Clean Air Act establishes a comprehensive approach to reducing the widespread "criteria" pollutants, which include the ozone, nitrogen oxides, and particulates in smog. EPA sets national standards for criteria pollutants and the states must take action to ensure the standards are met. Areas that fail to meet the standards for at least one criteria air pollutant are called "nonattainment areas."

Areas of nonattainment for criteria pollutants have been classified according to the extent of pollution. The five classes for ozone range from marginal (relatively easy to clean up quickly) to extreme (will take a lot of work and a long time to clean up). The 1990 Clean Air Act uses these classes to tailor cleanup requirements to the severity of the pollution and set realistic deadlines for reaching cleanup goals. Many of the smog cleanup requirements involve motor vehicles (cars, trucks, buses). Also, as the pollution gets worse, pollution controls are required for smaller sources.

Strategies that may be required by law to reduce and control air emissions include state permitting programs, changes in the composition of gasoline, use of alternative fuels (such as natural gas and electricity), and use restrictions imposed by individual communities. Innovative approaches being taken by local governments across the country to reduce air pollution in nonattainment areas include: banning charcoal barbecues and wood burning in stoves or fire places when pollution levels are high; developing programs to encourage car pooling; restricting traffic in congested areas; expanding or improving public transportation systems; requiring employers to contribute to employee mass transit costs; assessing "smog fees" on cars in proportion to the number of miles driven and vehicle emissions produced; and even buying and scrapping older, "super-dirty" cars.

References and Suggested Reading

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